

Botany in North America

In Honor of the XVI International Botanical Congress August 1-7, 1999 • St. Louis, Missouri





Diversity - Habitats and Species: Large migratory herds of caribou are found in the treeless landscapes of northern Canada and Alaska. The animals' existence depends upon the herbs, lichens, and shrubs they eat. The interdependence of plants and animals in an ecosystem means that loss of just one species can threaten many others.

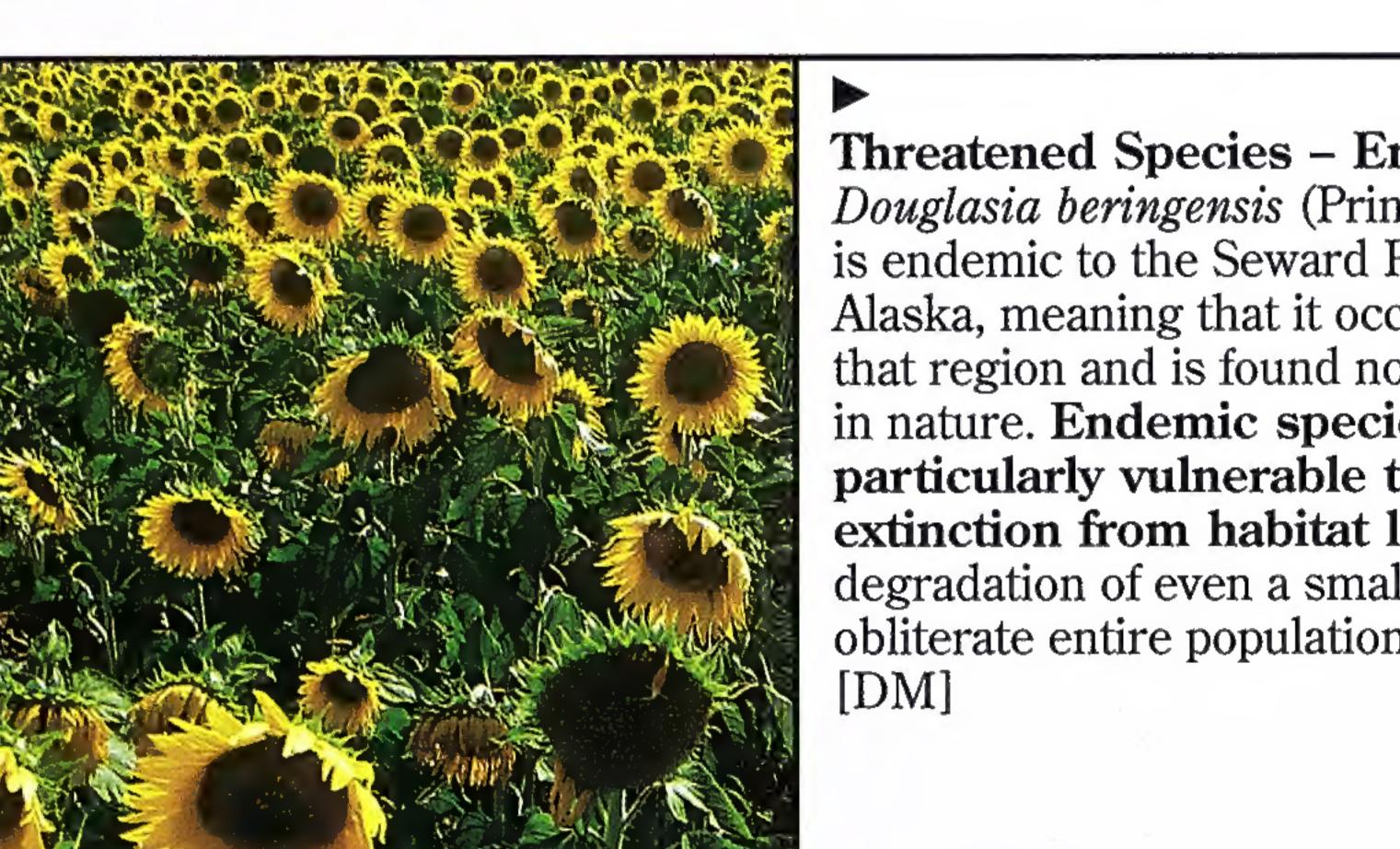


Habitat – Arctic Coastal Plain: Some of the largest petroleum reserves in North America lie beneath one of the continent's most delicate ecosystems. The growing season in the northern latitudes of North America is relatively short, but the region abounds with a diversity of plant life shared with the northern extremes of Europe and Asia. Current patterns of plant distribution are the result of relatively recent climatic changes and warming trends of the past 20,000 years. [DM]

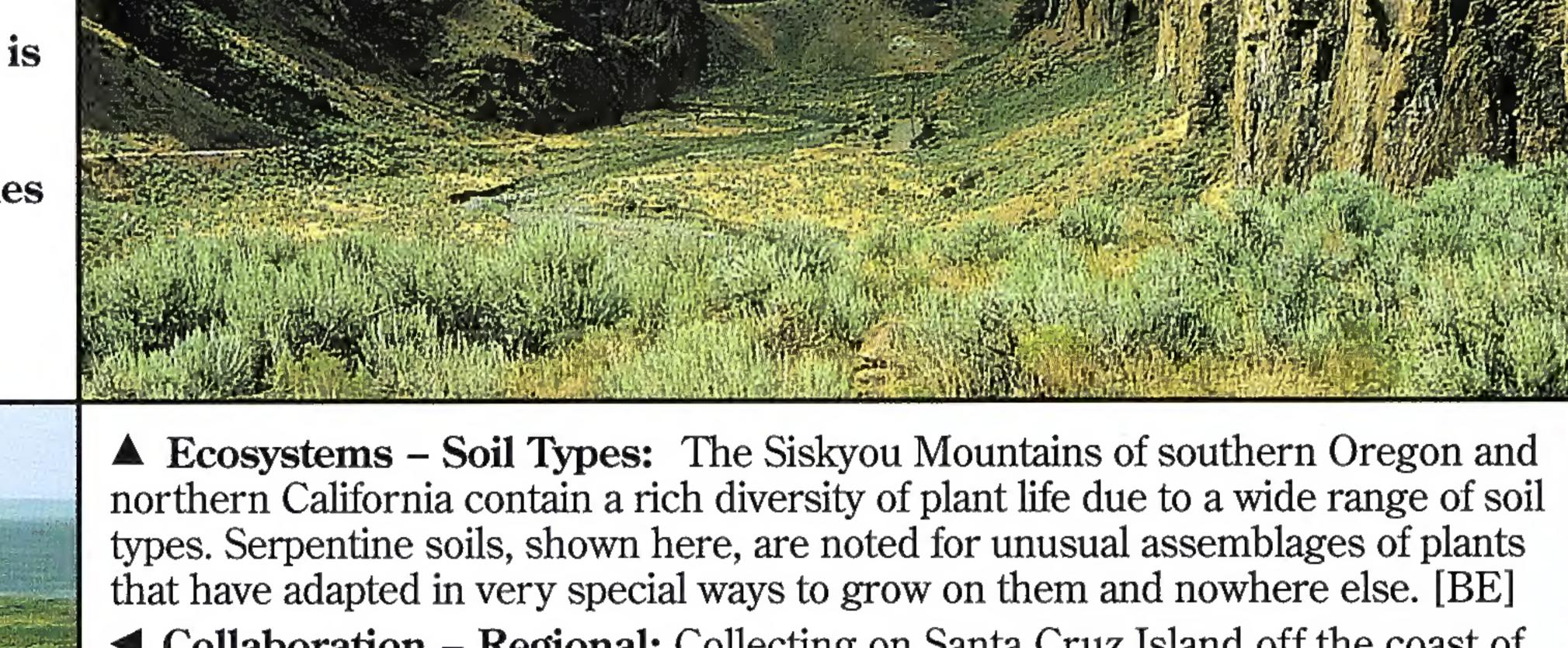


XVI International Botanical Congress: The world's largest gathering of plant scientists was hosted by MBG in collaboration with North American botanical institutions, including the Royal Ontario Museum and Universidad Nacional Autónoma de México. Nearly 5,000 participants from the USA and more than 100 other countries gathered to discuss how plant life affects the stability and sustainability of life on earth. The Congress, which is convened only once every six years, last met in North America in 1969. It serves as a forum for a broad spectrum of scientists whose work on plants ranges from ecology, systematics, biochemistry, and molecular biology, to agriculture, bioprospecting, and medical botany. Above: Yosemite National Park. [GY]

As a leader in gathering and sharing botanical information, MBG actively encourages the exchange of ideas among scientists, business leaders, environmentalists, and conservationists.



Rain Forests – Temperate: The need to protect the biological diversity of tropical rain forests is well known, but the temperate rain forests of the Pacific Northwest in Alaska, Canada, and Washington state are equally threatened. The primary threat to biodiversity worldwide is loss of habitat, driven by a growing human population. Sustainable development provides for human needs without sacrificing future productivity.



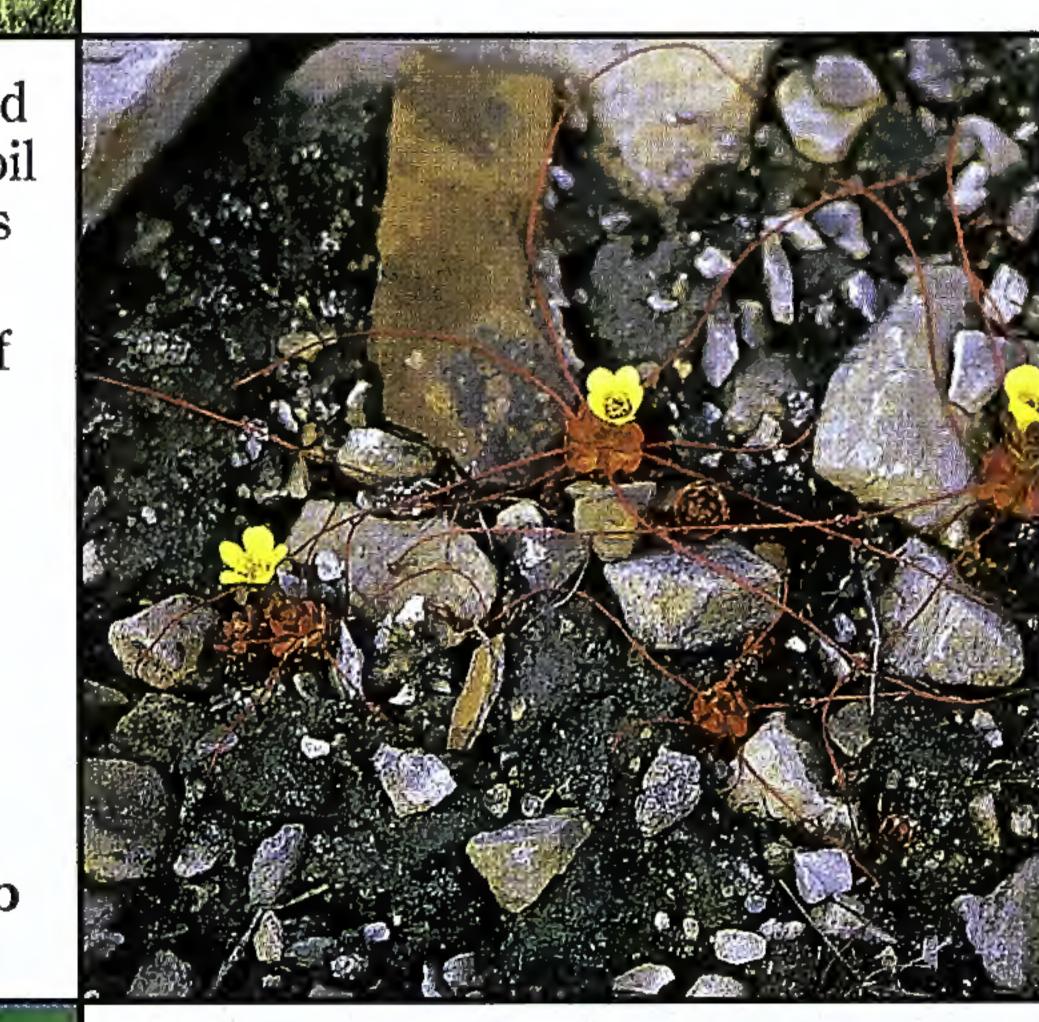
Distribution – Arctic: Saxifraga flagellaris (Saxifragaceae), found around the Arctic circle, was first described from the Old World. The plant develops stolons, which produce new plantlets away from the main plant. In these extreme climates, the short growing season puts the flowering period in jeopardy and seed production can be reduced. Species such as this Saxifraga have adapted methods of reproduction that enhance their chances of survival in the harsh Arctic climate. [DM]

Threatened Species – Endemic: Douglasia beringensis (Primulaceae) is endemic to the Seward Peninsula of Alaska, meaning that it occurs only in that region and is found nowhere else in nature. Endemic species are particularly vulnerable to extinction from habitat loss, as the degradation of even a small area can obliterate entire populations of plants.



■ Collaboration – Regional: Collecting on Santa Cruz Island off the coast of southern California, botanists investigate the spring flowering Lasthenia, or "Goldfields," (Asteraeae). Botanists from dozens of institutions collaborate to study the flora of states, regions, and continents. Nearly 1,000 botanists have participated in the massive Flora of North America project as authors, editors, or reviewers. [BE] Compiling and sharing information is a primary focus of the research

program at MBG. TROPICOS, developed and maintained at MBG, is the largest and most widely used botanical database in the world. A graphic interface version, W3TROPICOS, is available on the MBG Web site at www.mobot.org.



Economic Plants – Forests:

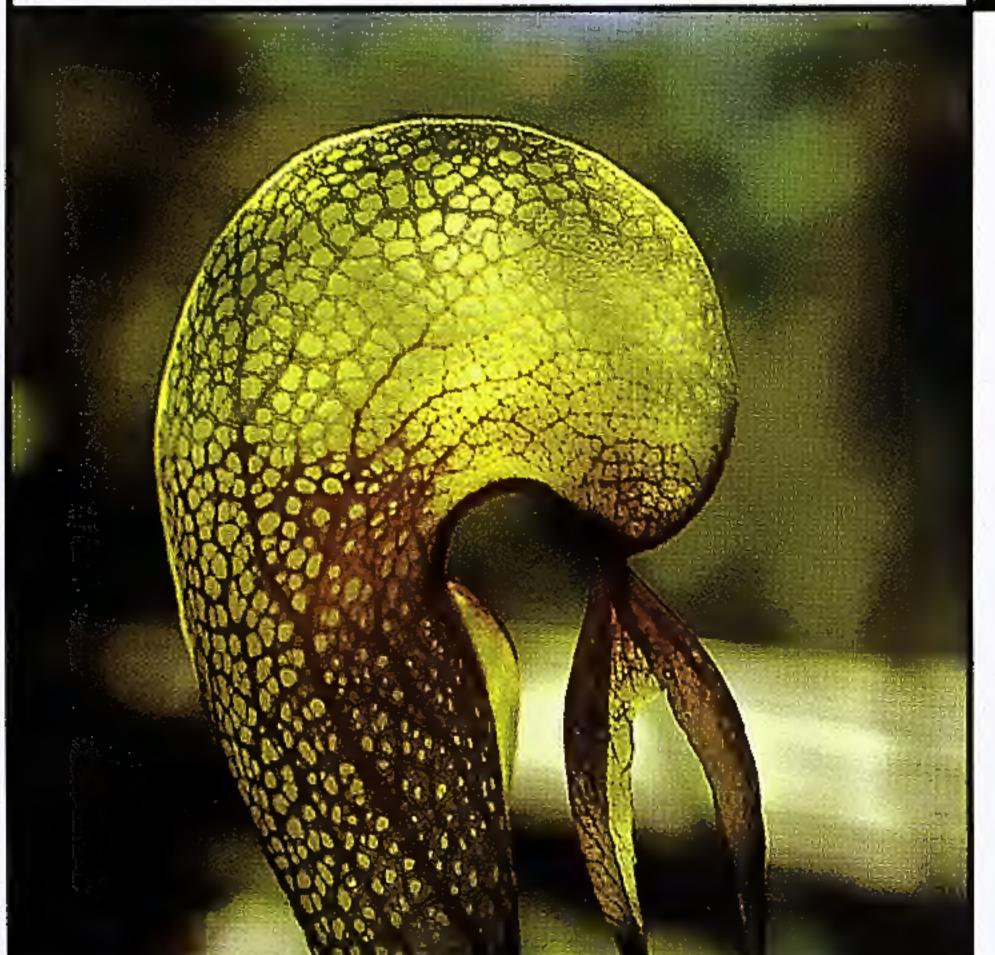
Economic Plants - Native: Sunflowers, Helianthus annuus (Asteraceae), above, are cultivated for their oil and seeds in temperate climates worldwide.[JZ] Sunflowers are the only field crop native to the U.S., compared to about 150 native to Mexico. Corn or maize, Zea mays (Poaceae), right, a member of the grass family, was originally developed from native species in Mexico.[WJ] Three species of grasses, corn, wheat, and rice, are the world's most important food crops.



Habitat - Prairie: Grasslands once covered millions of acres of the North American continent; today only 40% remain, mainly in the western United States. Botanists continue to discover new species every year in North America. Copeland Prairie in central Idaho (right) contains several recently discovered undescribed plant species. Worldwide, species are being lost to habitat destruction before they can be evaluated for their usefulness to humans. [BE]



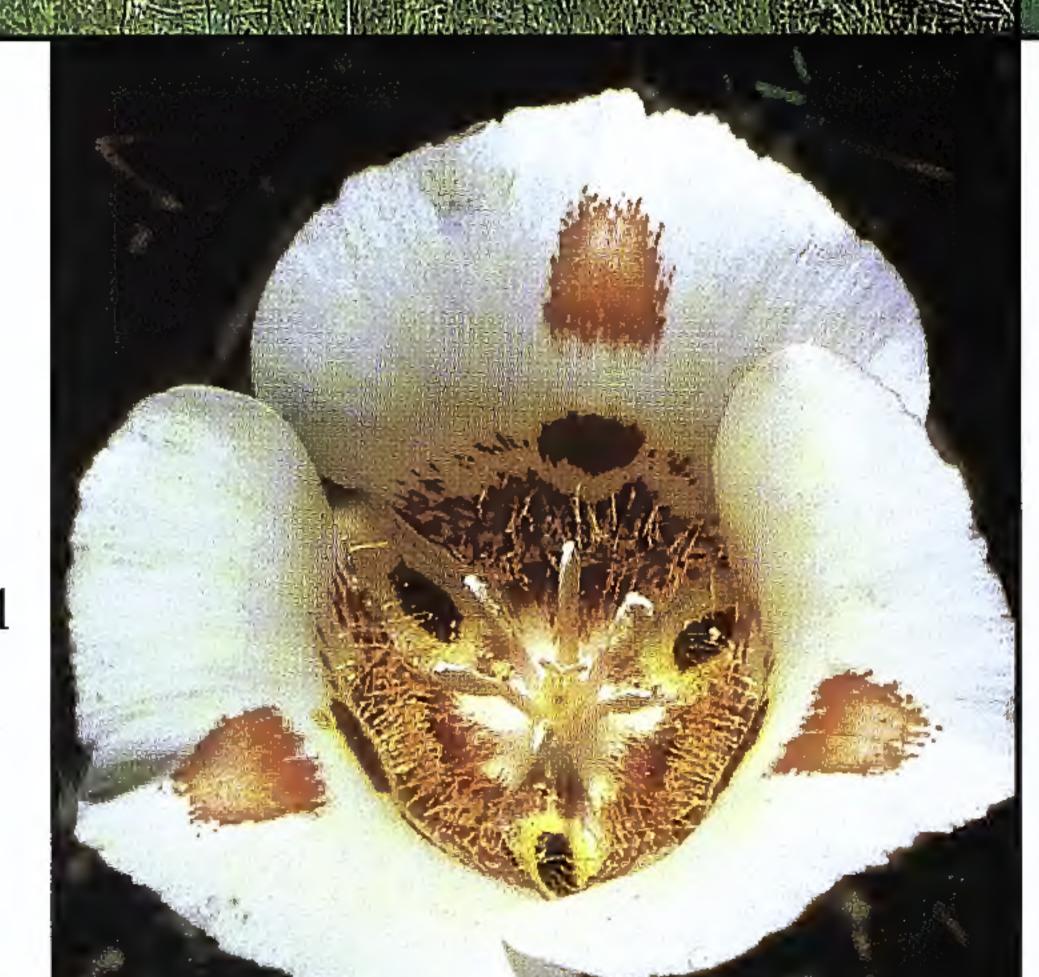
Coniferous forests are long-term investments, providing renewable sources of lumber, paper, and other products. Harvests occur only after many years of growth. Pine plantations are a valuable source of revenue in the southeastern U.S., where the soils are often poor or sandy and not well-suited for growing other crops. [WJ]



New Discoveries - North America: Mimulus lewisii (Scrophulariaceae) is one of approximately a hundred species of "monkey flowers." In North America the genus is most diverse in the West, with the California Floristic Province containing some 70 species. Three species of monkey flowers are known in Kansas. In the last 20 years nearly 1,200 new species and varieties of plants were described for North America north of Mexico. [AY]



Conservation – Threats: Wild populations of Calochortus venustus (Liliaceae) are threatened by overcollection. With 65 species, the genus has its greatest diversity in California, and many are of special conservation concern. Another species of Calochortus is included in the National Collection of Endangered Plants maintained by the Center for Plant Conservation (CPC). The CPC, headquartered at MBG, works to conserve rare and endangered plants native to the U.S. [PF]



Habitat – Desert: Dry landscapes

and deserts of many kinds abound in

Mexico. The wide range of climates,

topography, and geology through

extraordinary array of biodiversity.

world. Shown at left, Cephalocereus

columna-trajani (Cactaceae) in the

Mexico is perhaps the third most

biologically diverse country in the

geological time has produced an

Habitat - Pine Forests: The "longleaf pine," Pinus palustris, (Pinaceae) colonizes areas cleared by fire and is the state tree of North Carolina. Historically this species has been valued in the southeastern U.S as a source of lumber, turpentine, pine oil, tar, and pitch, and more recently as a source of pulpwood.



Distribution - Widespread: Darlingtonia californica, (Sarraceniaceae), is a pitcher plant found in *Sphagnum* bogs in the mountains of southwestern Oregon and adjacent California. Eight species of pitcher plants in the genus Sarracenia are known from the southeastern U.S., and the third genus in the family is known from the "Lost World" region of southern Venezuela. [AY]



Diversity - North to South:

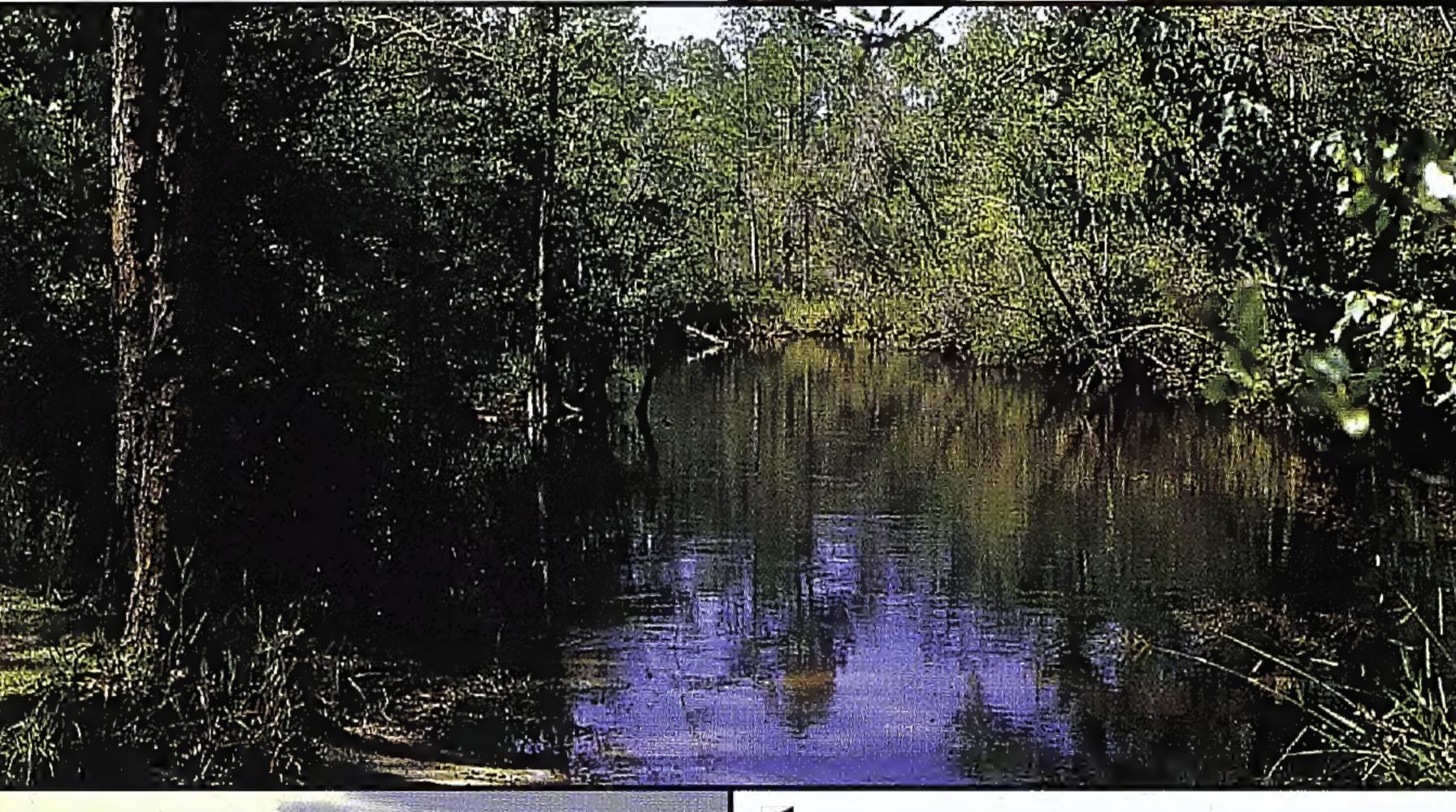
Ecosystem – Wetlands: Taxodium distichum (Cypressaceae), or bald cypress, is the state tree of Louisiana. It is found throughout the southeastern U.S. from Texas to Delaware and north to southern Illinois and southern Missouri. The trees' trunks are enlarged at the base and often are conspicuously buttressed. Wetlands filter and cleanse water and provide refuges for many species of plants and animals. Human pressures are the greatest threat to wetlands. [WJ]

thirds of the approximately

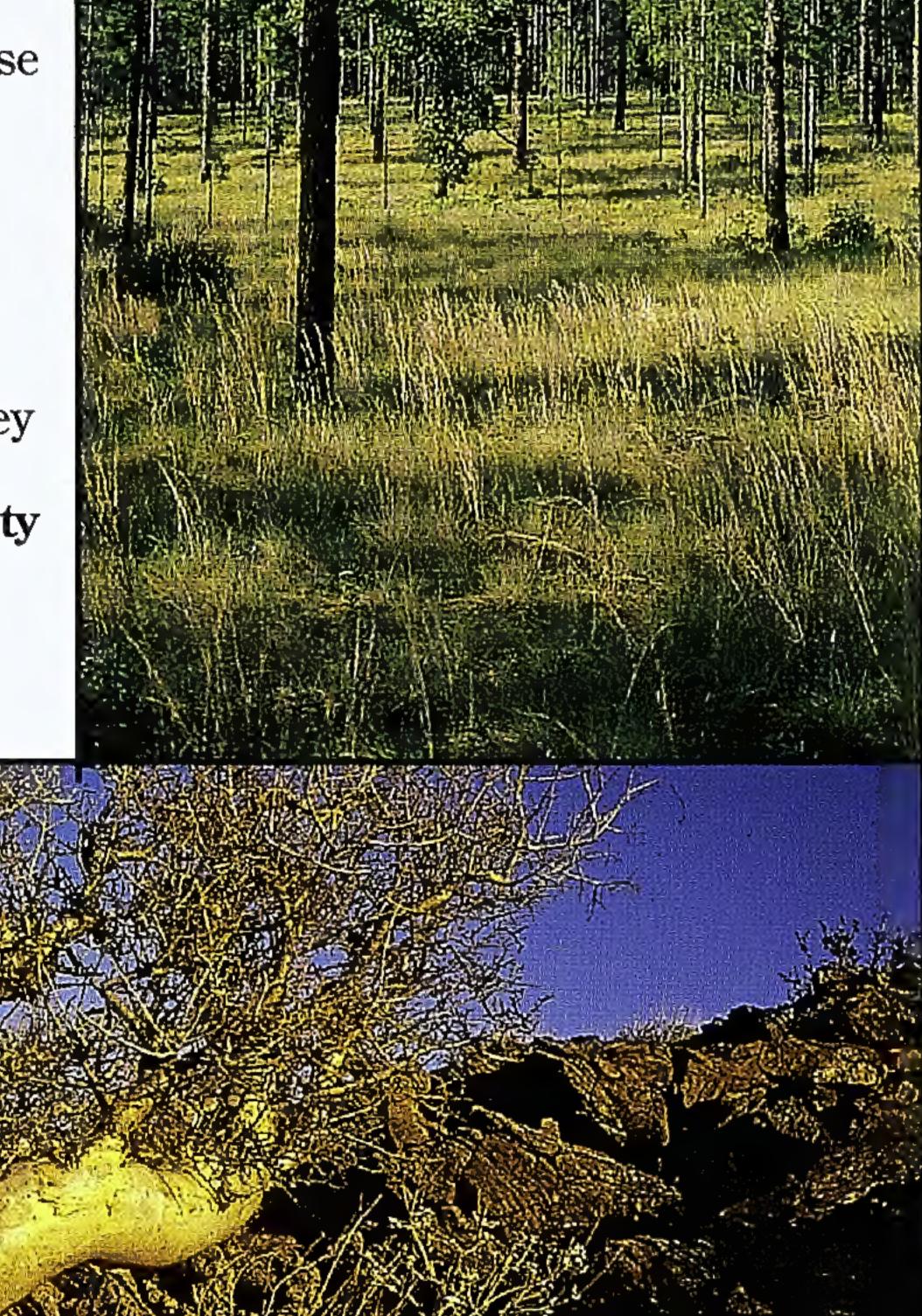
member of Fabaceae, the

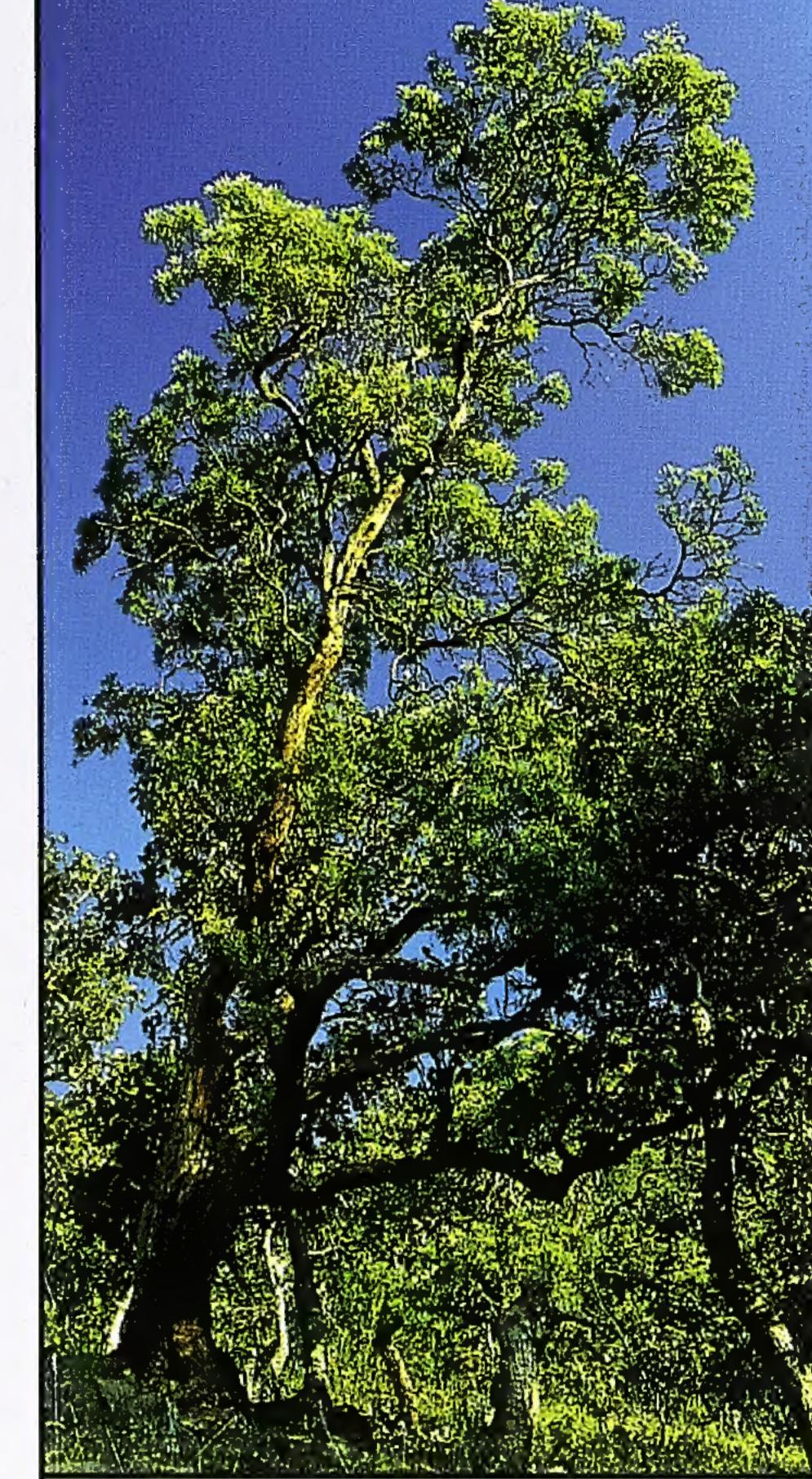
economically important legume

300,000 species of flowering

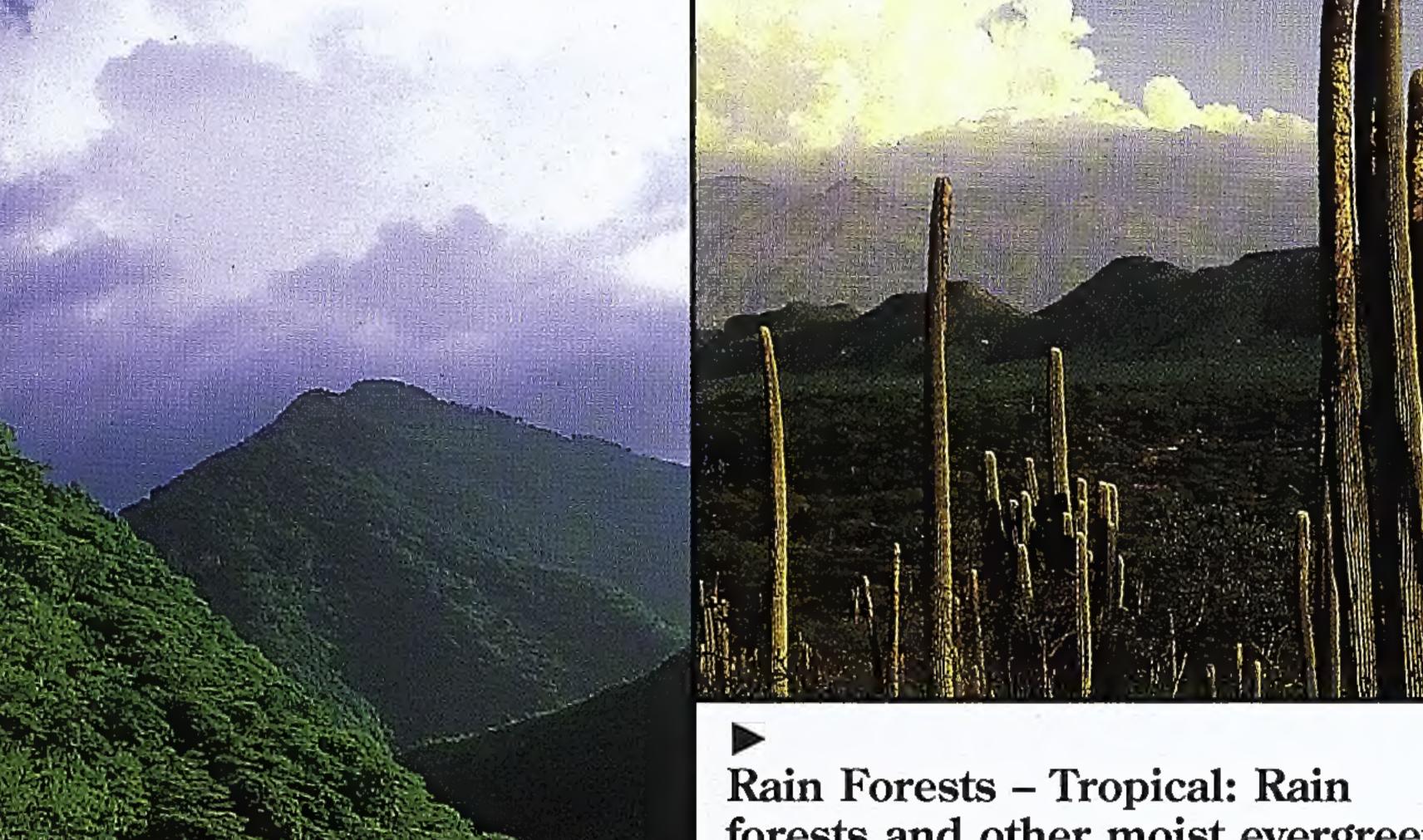


Habitat – Riverine Forest: This swamp forest on Eglin Air Force Base in the Florida Panhandle is an example of fragile ecosystems protected by governmental reservations in North America. Tens of millions of acres in North America under government control receive some protection because they are not directly accessible to the public. Preservation of biodiversity in these areas can be strictly controlled. [SF]





In North America, botanical diversity increases southward toward the tropics. Mexico, with approximately 23,000 species of plants, is characterized by megadiversity, as are Brazil, Colombia, Peru, Madagascar, India, China, Indonesia, and Australia. Together these countries contain 60-70% of all the world's known species. At left, Madroño, Arbutus sp. (Ericaceae), Sierra de Nauchititl.[PT] At right, the Sierra Gorda protects nearly a million acres in Mexico. This mountainous region encompasses the southern limit of many neo-arctic species and the northern limit of many tropical species. Created in 1997, the preserve is a refuge for an extraordinary diversity of plants and animals. [PT] Below, the unusual fruits of the monkey nut palm, Manicaria saccifera (Arecacae), which grows in freshwater swamps. Manicaria reaches its northern limit in the Yucatán Peninsula. [OT] Mexico is the northernmost limit for many tropical species that have a wide distribution to the



forests and other moist evergreen forests are the predominant vegetation types in southern **Mexico.** These forests are extremely diverse in species that include many epiphytes, herbs (including numerous species of ferns), and shrubs, in addition to the dominating trees and lianas. Right, Aphelandra aurantiaca (Acanthaceae) is a common understory herb or shrub that ranges from Mexico to northern South America. [OT]

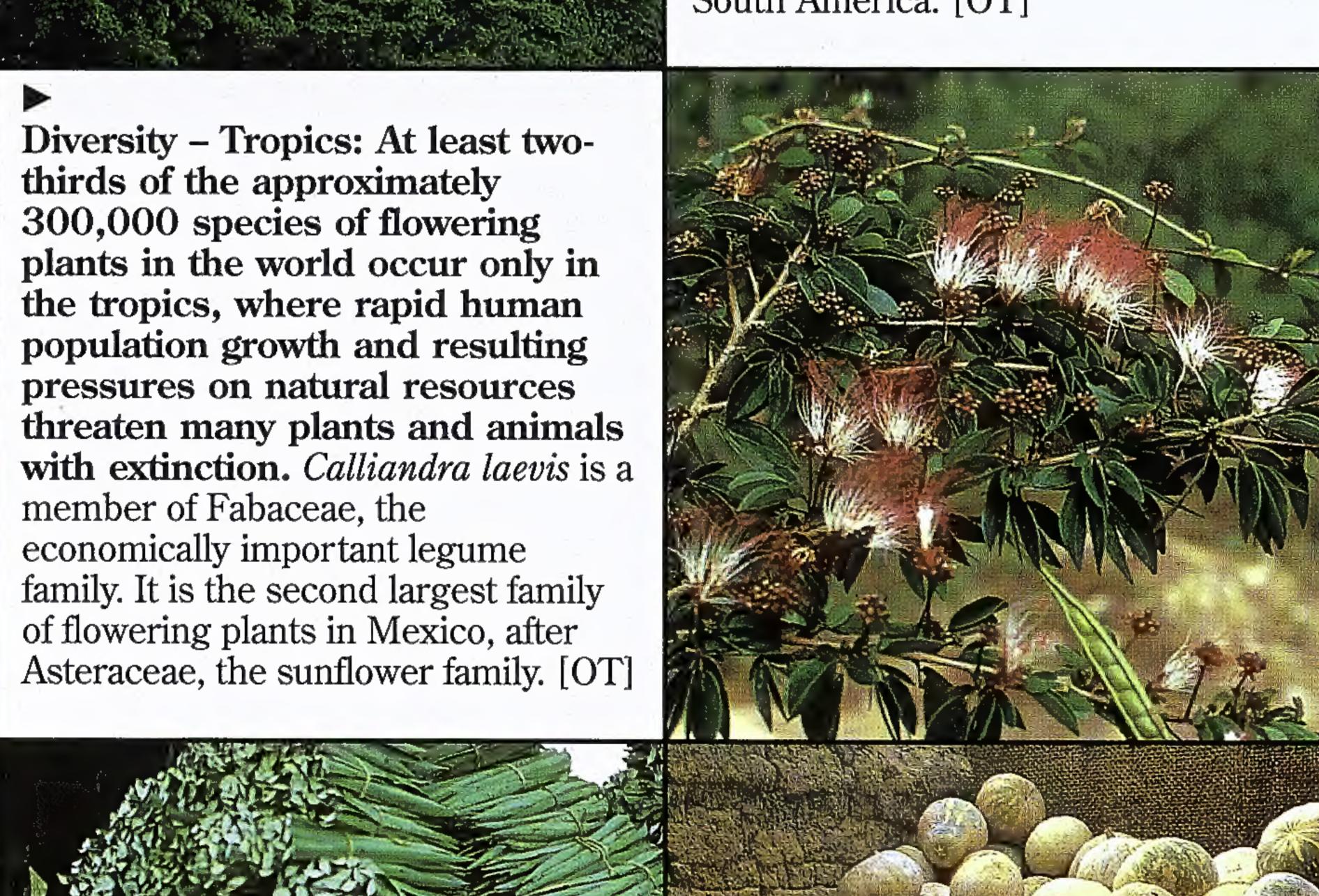


Adaptations – Drought: Bursera microphylla Gray (Burseraceae), the elephant tree of Baja California, is one example of an enormous array of drought-adapted species that have evolved in dry habitats. Bursera is one of a number of genera where the majority of known species in the world have evolved in Mexico. Other prominent examples of genera with large numbers of species in Mexico are the pines, *Pinus* spp. (Pinaceae), and oaks, Quercus spp. (Fagaceae). [AY]

Economic Plants - Weeds/Foods: Prickly pear, Opuntia (Cactaceae) is a very large, widespread, and economically important genus. Some species have become naturalized and act as pests in hot, dry regions of the world. Other species, the *nopales*, serve as fodder, and others are highly esteemed for human consumption, both for the pads as vegetables, and the fruits. Cactaceae, the cactus family, is almost exclusively restricted to the New World. Below, Opuntia microdasys. [HH]



Economic Plants – Cultivation: Sisal, Agave sisalana (Agavaceae), is cultivated for its leaves, which provide fiber for rope and mats. Another species, A. americana, is cultivated for its sap, from which tequila is made. Many native plants have been domesticated in Mexico, and many essentially wild plants are also utilized for various purposes. Cultivated plants often spread far from their place of origin; in the case of sisal,

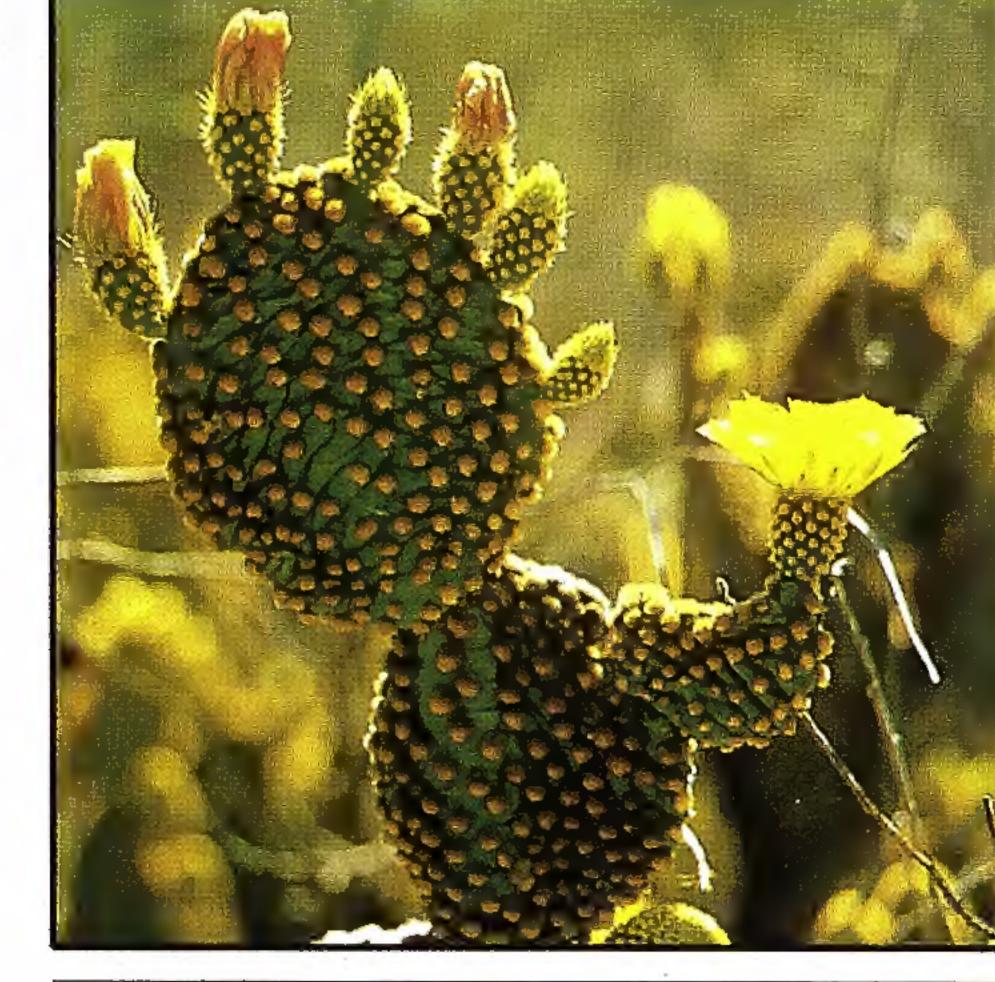


Economic Plants - Foods: Mexico, in contrast to the rest of North America, is a major source of crops. More than 150 species of cultivated plants have been selected by the prehispanic cultures of Mexico, including maize (corn), beans, chiles, squashes and pumpkins. Many squash and pumpkin cultivars have been selected over time and are valued for their flesh and seeds. Left, Curcurbita pepo (Curcurbitaceae),

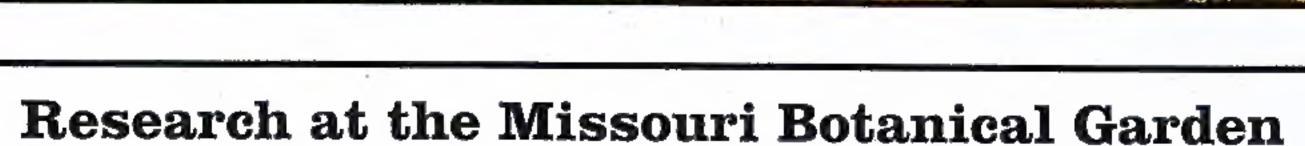
ready for market. [PT]

Economic Value – Forestry/Horticulture: Vochsia hondurensis (Vochysiaceae), left, is one of the showiest native trees to be seen in southern Mexico during May and June. Often called San Juan, its timber is widely used for many purposes. Echinocactus grandis (Cactaceae), below, is one example of the many species of cacti cultivated for their unusual growth forms, large colorful flowers, and spectacular ribs and spines. [OT], [OT]

Plants and Sustainability: Sustainable living meets the demands of today without sacrificing the natural resources that will be needed to support future generations. Achieving sustainability will require international cooperation among leaders of nations, business, science, and education. Botanical research provides fundamental scientific information needed by decision makers as we chart the course for the environmental future of our planet. MBG is a world leader in discovering and sharing information about plants.



Brazil, Kenya, and Tanzania are the world's leading producers. [GD]



About 50 Ph.D.-level scientists, many of whom live abroad, assisted by about 80 technical staff and 25 graduate students, form the MBG Research Division. Their studies are concentrated on the plants of Mesoamerica, South America, MBG scientists are specialists in the plants of particular regions or in the

MBG serves as headquarters for the Center for Plant Conservation and for the major collaborative projects Flora of China and Flora Mesoamerica. To help

disseminate botanical information, MBG floristic research and library resources

are available on the Garden Web site at http://www.mobot.org. MBG botanists collaborate with local institutions in each country where they conduct research, providing technical expertise, assisting with fundraising, establishing better communication with the worldwide scientific community,

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We dedicate this poster to all scientists and instutions participating in the XVI International Botanical Congress, held in St. Louis August 1-7, 1999.

Dedication

Subsaharan Africa, Madagascar, China, Vietnam, and North America. Individual classification of major plant families.

training botanists in the field and at MBG, and helping to build infrastructure. Botanical research provides basic scientific knowledge needed to develop conservation policies to preserve global biodiversity.